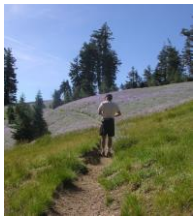
Got Data?

Trail and Road Assessments Made Easy

CALIFORNIA trails & greenways CONFERENCE



Presenter:
Michael Fuller,
Certified Engineering Geologist,
California Geological Survey

TWO BIG STEPS

1. Getting the Data
   - terminology
   - methodology
     - speed vs. detail
2. Using the Data
   - products
   - projects

Gentlemen, start your devices!

Trails and Roads Assessments

Core Objective 1:
Identify features, conditions, constraints, treatments, and costs

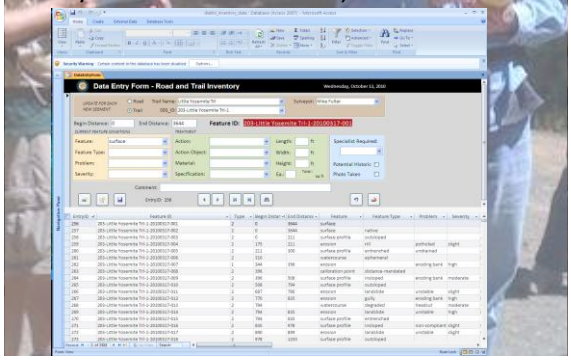
Data Collection

- Assessments are long-term investments. Our products (geodatabase, reports, maps) are designed to support future data and analyses. We emphasize collection of data that is easily repeatable and consistent.
- Consistency is key to keeping the products robust and useful for the long term. This way we build a volume of legacy data that remains compatible with and comparable to newly collected data.

Consistency

- To achieve and maintain consistency, we are developing data standards and standard procedures.
- Standards will include methods of data collection, equipment settings, data format, required data attributes, documentation methodologies, geo-referencing, and accuracy levels.
- The use of standards whenever possible will improve efficiency and makes the data and products useful and reliable.
- This is especially important because multiple agencies or organizations are often involved in road and trail projects.

Data Entry with Quality Control Trail/Road Data Collector, *beta version 1.0*



Definitions

- Features: Objects encountered along a road or trail, such as; gates, intersections, watercourses, etc.
- Conditions: Observable aspects of the features that describe the physical quality of the roads or trails.
- Constraints: Observable aspects of the built or natural environment (aka "design criteria") that affect conditions and limit the options for maintenance, such as; landslides, slope steepness, infrastructure, and use demands.

Definitions, continued

- Treatments: Standardized activities (i.e. Best Management Practices (BMPs)) that alter the use or physical condition or environment for the purpose to repair, restore, or maintain roads or trails.
- Costs: The financial demands to implement each standardized treatment or any set of treatments.

Features

- Over one hundred different types of features
- Different subtypes may include different materials that compose the feature, such as; steel, wood, masonry, etc.
- Dimensions are important aspects of features.
- The condition of features may deteriorate into problems or hazards.

Conditions

- Data is collected for conditions that require treatment or maintenance.
- Problems are grouped into approximately ten types.
- The severity of problems is ranked on a four level scale.
- When particular specialists are needed for input, the record is flagged accordingly.

Conditions change through time

- Factors that deteriorate road and trail conditions include:
  - Erosion;
  - Intense use;
  - Unintended or unauthorized use such as user created trails;
  - Abuse such as vandalism or theft;
  - Neglect.

Conditions and Constraints

- Constraints become problems when not adequately considered in the design of roads and trails or in the selection of treatment options.
- Problems like degraded conditions may reveal that some constraint was overlooked.
- Treating the symptoms without understanding the underlying disease leads to prolonged, repetitive efforts.
- Problems are easier to recognize and measure than constraints.
- Specialists may help to identify and manage constraints which can be complex –before problems arise.

Constraints

- The variability of the natural environment defies one-size-fits-all approaches. These can range in size from small sites to entire landscapes. These include:
  - Episodic events, such as; landslides, floods, heavy downpours, fires, and earthquakes;
  - Gradual changes, such as; erosion, sedimentation, ground water changes, stream aggradation, and climatic shifts;
  - Fixed conditions, such as; rock type and strength, soil type and erodibility, topography, and hydrology.

Constraints continued

- The built environment influences local demands and the feasibility or cost of certain approaches.
  - This includes infrastructure, both current and past.
  - Equipment access is needed to maintain current infrastructure.
  - Remnants of past infrastructure or landuse activities can impact current conditions and constrain treatment options and influence costs.

Constraints continued

- Logistical
  - Access, equipment, personnel, funds, etc.
- Legal
  - Agreements, contracts, charters, laws, etc.
- Safety
  - Emergency response, law enforcement, hazard abatement, etc.
- High or conflicting demands
  - Resource extraction versus recreation versus preservation
  - The needs of the greater infrastructure

Treatments "action items"

- Correcting, reducing, or stabilizing problems
- Changing the design or use to prevent new problems
- Treatments can be a combination of:
  - Administrative Controls,
  - Engineered Controls,
  - Stricter Enforcement

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Perform Triage

- Prioritize
  - Hazardous conditions
  - Magnitude of conditions
- For complex issues
  - Consult specialists
- For typical issues
  - Implement Best Management Practices

Administrative Controls

- Closure
- Alternative routes
  - Detours
- Downgrade level of use
  - Restricted use
    - Seasonal closure
    - Limited permits

Engineered Controls

- Redesign and Reconstruction
  - Go for the Fail Safe approach
    - Major engineering
  - Finesse a "fail soft" solution
    - Minor engineering with back up devices
    - Best Management Practices

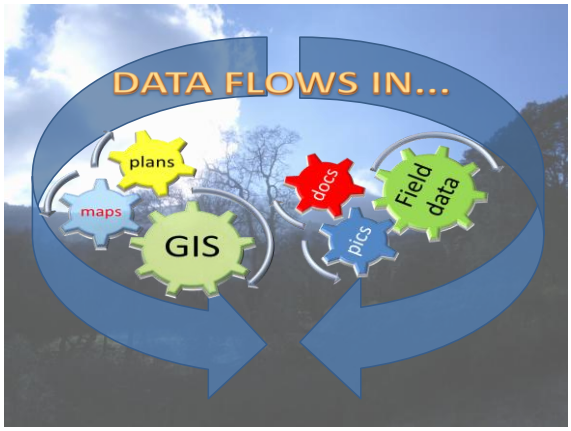
Best Management Practices

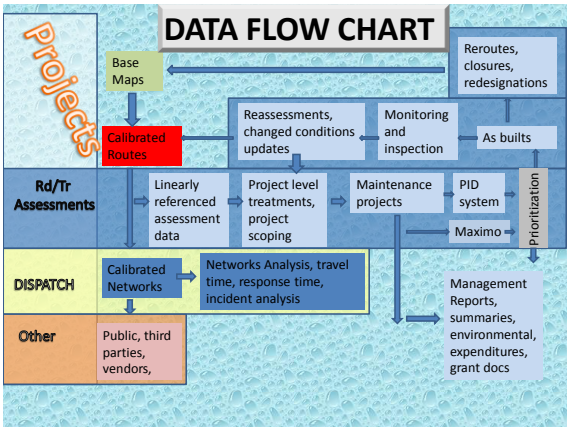
- Tried and Proven Treatments
  - A suite of options to choose from with:
    - Standardized Terms
    - Standardized specifications and drawings
    - Predictable effectiveness
    - Predictable costs

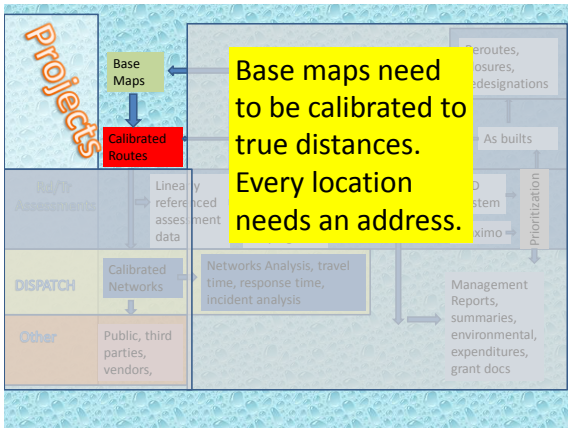
Bringing the Data out of the Fields and into the Files

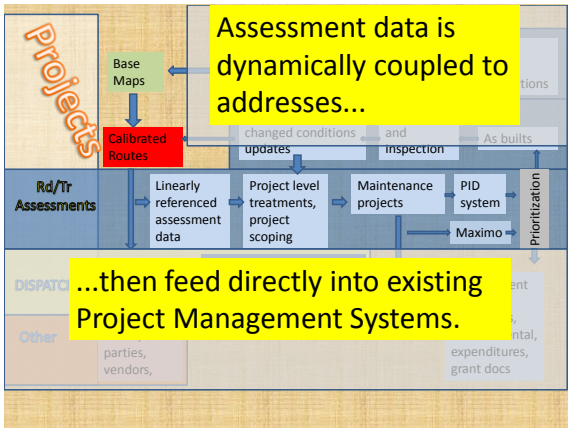
Core Objective 2:

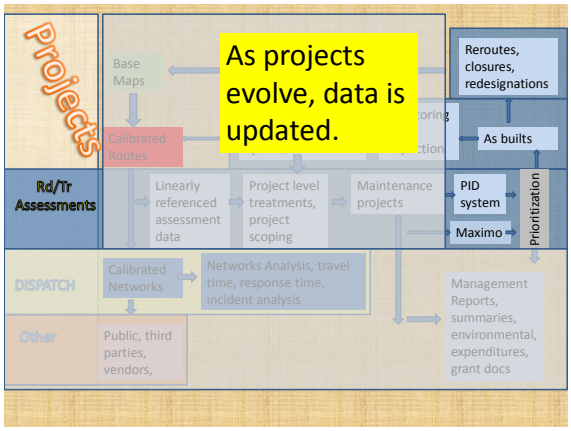
•Integrate the data with a dynamic knowledge base that generates a host of projects and products.






Projects
Base Maps
Calibrated Routes
Base maps need to be calibrated to true distances. Every location needs an address.
Rd/Tr Assessments
DISPATCH
Other
Calibrated Networks
Networks Analysis, travel time, response time, incident analysis
Public, third parties, vendors,
Management Reports, summaries, environmental, expenditures, grant docs


Projects
Base Maps
Calibrated Routes
Assessment data is dynamically coupled to addresses...
Rd/Tr Assessments
Linearly referenced assessment data
Project level treatments, project scoping
Maintenance projects
PID system
Maximo
Prioritization
...then feed directly into existing Project Management Systems.


Projects
Base Maps
Calibrated Routes
As projects evolve, data is updated.
Reroutes, closures, redesignations
As builts
Rd/Tr Assessments
Linearly referenced assessment data
Project level treatments, project scoping
Maintenance projects
PID system
Maximo
Prioritization
DISPATCH
Calibrated Networks
Networks Analysis, travel time, response time, incident analysis
Other
Public, third parties, vendors,
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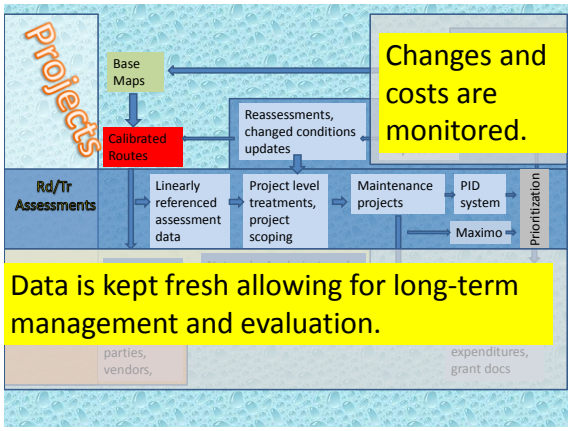
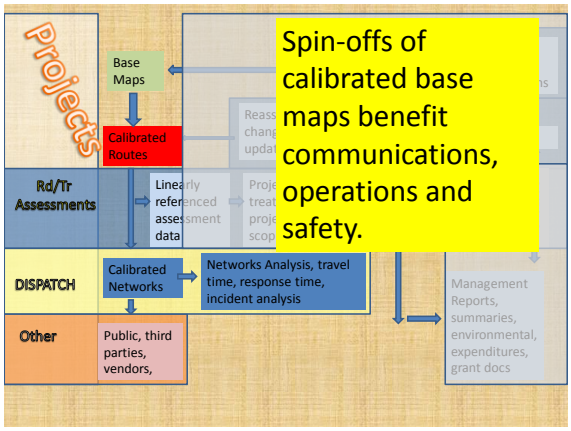
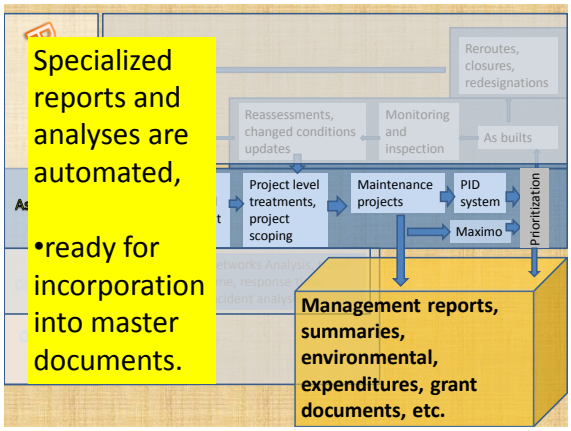
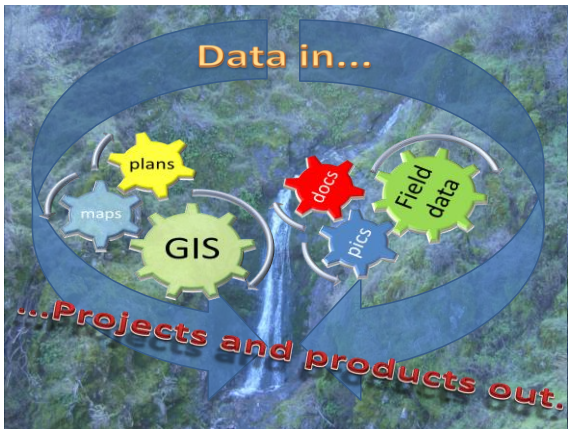

Projects
Base Maps
Calibrated Routes
Changes and costs are monitored.
Reassessments, changed conditions updates
Rd/Tr Assessments
Linearly referenced assessment data
Project level treatments, project scoping
Maintenance projects
PID system
Maximo
Prioritization
Data is kept fresh allowing for long-term management and evaluation.
parties, vendors,
expenditures, grant docs


Projects
Base Maps
Calibrated Routes
Spin-offs of calibrated base maps benefit communications, operations and safety.
Rd/Tr Assessments
DISPATCH
Calibrated Networks
Networks Analysis, travel time, response time, incident analysis
Other
Public, third parties, vendors,
Management Reports, summaries, environmental, expenditures, grant docs


Specialized reports and analyses are automated,
•ready for incorporation into master documents.
Reroutes, closures, redesignations
Reassessments, changed conditions updates
Monitoring and inspection
As builts
Project level treatments, project scoping
Maintenance projects
PID system
Maximo
Prioritization
Management reports, summaries, environmental, expenditures, grant documents, etc.


Data in...
plans
maps
GIS
docs
pics
Field data
...Projects and products out.